

Urethral Dilatation after Urethrotomy for Urethral Stricture: A VMMC Protocol

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Objective: To document the VMMC Urethral Dilatation Protocol, established in Veterans Memorial Medical Center for male patients with urethral stricture who underwent urethrotomy and to determine if there is a significant difference in the International Prostate Symptom Score and Uroflowmetry studies after urethral dilatation in male patients with urethral stricture who underwent urethrotomy.

Materials and Methods: This is a descriptive, retrospective chart review of male patients in Veterans Memorial Medical Center diagnosed with urethral strictures via voiding cystourethrogram or flexible cystoscopy who underwent urethrotomy. A total of 24 patients were enrolled in this study, all of whom were post TURP patients. All patients with recurrent urethral stricture, history of trauma and patients with infectious causes of stricture were excluded. Each patient's International Prostate Symptom Score and Uroflowmetry studies prior to urethrotomy and post urethrotomy who underwent the VMMC urethral dilatation were collected. Median and range (Minimum-Maximum) were used to describe the variables of the study. These variables are IPSS, peak flow rate, average flow rate, voided volume, and residual volume.

Results: The IPSS, was statistically lower after urethrotomy with urethral dilatation and the uroflowmetry parameters (peak flow rate, average flow rate, voided volume, and residual volume) were statistically improved after urethrotomy with urethral dilatation.

Conclusion: The Urethral Dilatation Protocol established in Veterans Memorial Medical Center and which is done every week for 1 month, then every 2 weeks for another 1 month, and monthly until there is markedly improved International Prostate Symptom Score showed that this timing may help improve IPSS and patient symptoms but not lessen recurrence rates.

Key words: urethral dilatation, urethrotomy, urethral stricture

Introduction

In most instances, a urethral stricture is a narrowing of the caliber of the urethra caused by the presence of a scar consequent on infection or injury.¹ Urethral stricture is a common condition that can lead to serious complications such as urinary infections and renal insufficiency secondary to urinary retention.² The most

important causes are idiopathic, transurethral resection, urethral catheterization, pelvic fracture and hypospadias surgery.³ Urethral stricture disease is significant, resulting in hundreds of millions of dollars spent and hundreds of thousands of caregiver visits yearly in the United States.⁴

The most common procedures used by those surveyed for urethral strictures were dilation

(92.8%), optical internal urethrotomy (85.6%) and endourethral stent (23.4%).⁵ There were insufficient data to determine which intervention is best for urethral stricture disease in terms of balancing efficacy, adverse effects and costs. Well-designed, adequately-powered multi-center trials are needed to answer relevant clinical questions regarding treatment of men with urethral strictures.⁷

Dilations are easy to perform in every day clinical practice; however they show the highest recurrence rates while their outcomes are the less satisfying to the patients. Most patients with urethral stricture are offered optical internal urethrotomy initially. In fact, this procedure is preferred as the first treatment option by many urologists, as it is performed within short operative time either under spinal anesthesia or under local anesthesia. It can be also done as an outpatient procedure for the treatment of short urethral strictures. On the other hand, open urethroplasty shows the lowest recurrence rates and its outcomes are the most satisfying to the patients. Although it is the current gold standard against which the traditional treatments are compared, this technique requires skill, expertise, and equipment, often not available in the resource-limited settings.⁸

However, some literatures would suggest that postoperative urethral calibration and dilatation of a urethral stricture, primarily treated by internal urethrotomy, significantly reduces the stricture recurrence rate as well as delaying the time until recurrence.¹⁰ In the local setting, the authors do urethral dilatation in patients who underwent internal urethrotomy as a standard postoperative care.

To date, there is no standard protocol or other systematic review of care that focuses on urethral dilatation to patients who underwent internal urethrotomy, with regards to the timing of the procedure. In VMMC, they established a standard protocol of the timing or when to do urethral dilatation. Postoperatively, upon follow-up, urethral dilatation is done every week for 1 month, then every 2 weeks for another 1 month, and monthly until there is markedly improved International Prostate Symptom Score.

This study focused on the Urethral Dilatation Protocol, established in Veterans Memorial

Medical Center in male patients with urethral stricture who underwent visual urethrotomy in relation to the International Prostate Symptom Score and Uroflowmetry studies.

This study aims to document the VMMC Urethral Dilatation Protocol, established in Veterans Memorial Medical Center for male patients with urethral stricture who underwent visual urethrotomy.

As a treatment for male urethral stricture, urethrotomy has the advantages of ease, simplicity, speed and short convalescence. Urethrotomy can be performed as an outpatient procedure using local anesthesia, with an indwelling silicone catheter for 3 days after the procedure. Repeated Urethrotomy followed by long-term dilation is an alternative option for men with severe comorbidity and limited life expectancy.¹³

Performing intermittent self-dilatation regularly splints the urethra open. It might prevent the cut edges of a stricture from sticking together and contracting after an operation.⁹ With gradual urethral dilatation with metal sounds, the urethra is significantly dilated, maximum urethral pressure is significantly decreased and average flow rate is significantly increased.¹¹

A meta-analysis done showed that urethral dilatation is varied across multiple studies and the optimum frequency and timing of this technique, or whether indeed there is an optimum protocol, cannot be determined from the available body of evidence.¹²

Materials and Methods

Study Design

The study design is a descriptive, retrospective chart review.

Population and Setting

Included in this study were male patients diagnosed with urethral strictures via voiding cystourethrogram or flexible cystoscopy who underwent urethrotomy. A total of 24 patients were enrolled in this study, all of whom were post

TURP patients. All patients with recurrent urethral stricture, history of trauma and infectious causes of stricture were excluded.

Data Collection

Data were obtained via chart review of the patients who underwent the VMMC Urethral Dilatation protocol established by the Section of Urology, Veterans Memorial Medical Hospital. Such is done every week for 1 month, then every 2 weeks for another 1 month, and monthly until there is markedly improved International Prostate Symptom Score which is from severe (20-35) or moderate (8-19) to mild (0-7) symptoms, and improvement in uroflowmetry studies.

Each patient's data: International Prostate Symptom Score and Uroflowmetry studies prior to urethrotomy and post urethrotomy who underwent the VMMC Urethral Calibration and Dilatation protocol were collected.

The chart review was conducted 2 years retrospectively from the study date.

Data Analysis

Median and range (Minimum-Maximum) were used to describe the variables (IPSS, peak flow rate, average flow rate, voided volume, and residual volume) of the study.

Due to outliers, non-parametric statistics was applied instead of parametric statistics. Thus, Wilcoxon test was used to compare IPSS, peak flow rate, average flow rate, voided volume and residual volume. SPSS was used for data analysis.

Results

Table 1 presents the comparison of IPSS, pre and post-urethrotomy and urethral dilatation. The pretest has a mean value of 23.00 (17 - 30) which significantly decreased to 6.50 (3 - 10) with -71.74% mean difference. The IPSS, pre urethrotomy, urethral dilatation is statistically higher than the IPSS, post urethrotomy, urethral dilatation (Figure 1).

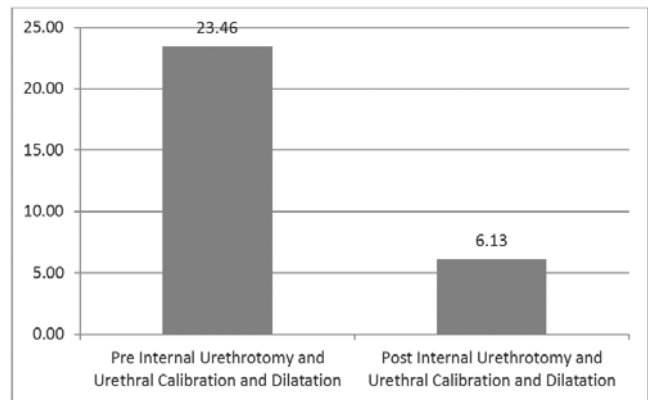


Figure 1. Comparison of the IPSS, pre and post urethrotomy and urethral dilatation.

Table 2 presents the comparison of pre and post urethrotomy, urethral dilatation in terms of peak flow rate, average flow rate, voided volume, and residual volume.

For flow rate, pretest has a mean value of 3.45 ml/s (1.5 - 8.4ml/s) which significantly increased to 13.25 ml/s (3.5 - 31.5 ml/s) with 284.06% median difference. (Figure 2). The pre peak flow rate is statistically lower than post peak flow rate.

Table 1. International Prostate Symptom Score.

IPSS n:24	Median	Range	Mean Difference	p-value	Interpretation
Pre Internal Urethrotomy, Urethral Calibration and Dilatation	23.00	17 - 30	-71.74%	0.000	Significant
Post Internal Urethrotomy, Urethral Calibration and Dilatation	6.50	3 - 10			

Table 2. Uroflowmetry

N:24	Median	Range	Median Difference	P-value	Interpretation
Pre Peak Flow Rate	3.45 ml/s	1.5 - 8.4 ml/s	284.06%	0.000	Significant
Post Peak Flow Rate	13.25 ml/s	3.5 - 31.5 ml/s			
Pre Average Flow Rate	2.50 ml/s	1.2 - 4.5 ml/s	132.00%	0.000	Significant
Post Average Flow Rate	5.80 ml/s	2.3 - 18.1 ml/s			
Pre Voided Volume	116.50 ml	56 - 382 ml	60.94%	0.000	Significant
Post Voided Volume	187.50 ml	87 - 482 ml			
Pre Residual Volume	50.00 ml	0 - 250 ml	-75.00%	0.001	Significant
Post Residual Volume	12.50 ml	0 - 50 ml			

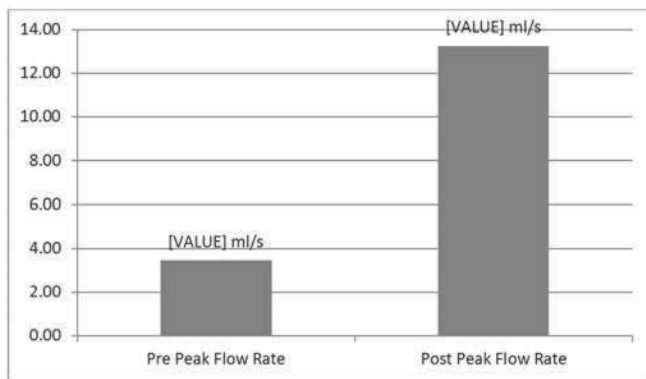


Figure 2. Comparison of pre and post urethrotomy, urethral dilatation in terms of peak flow rate

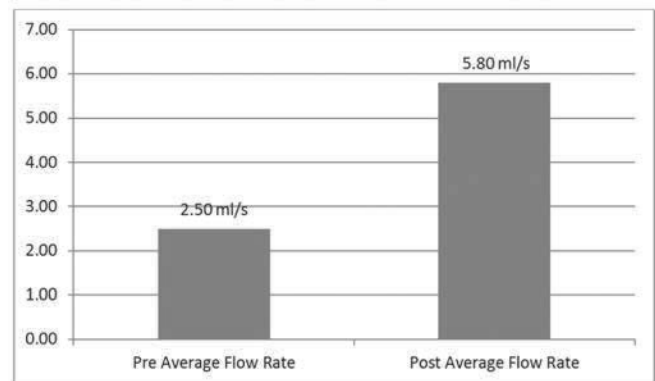


Figure 3. Comparison of pre and post urethrotomy, urethral dilatation in terms of average flow rate

For average peak flow rate, pretest has a mean value of 2.50 ml/s(1.2 - 4.5 ml/s) which significantly increased to 5.80 ml/s(2.3 - 18.1 ml/s) with 132.00% median difference. (Figure 3). This means that pre average peak flow rate was statistically lower than post average peak flow rate.

For voided volume, pretest has a mean value of 116.50 ml (56 - 382 ml) which significantly increased to 187.50 ml (87 - 482 ml) with 60.94% median difference. (Figure 4). This means that voided volume was statistically lower than post voided volume.

For residual volume, pretest has a mean value of 50.00 ml (0 - 250 ml) which significantly decreased to 12.50 ml (0 - 50ml) with -75.00% median difference. (Figure 5) This means that voided volume was statistically higher than post voided volume.

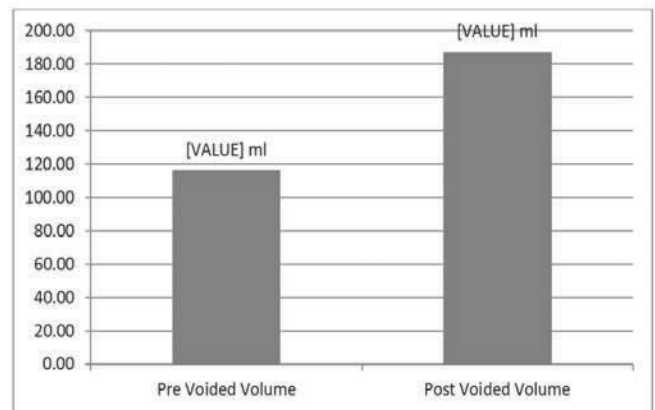


Figure 4. Comparison of pre and post urethrotomy, urethral dilatation in terms of voided volume

Discussion

In the present setting, urethral dilation is a commonly done office procedure. Each year, an

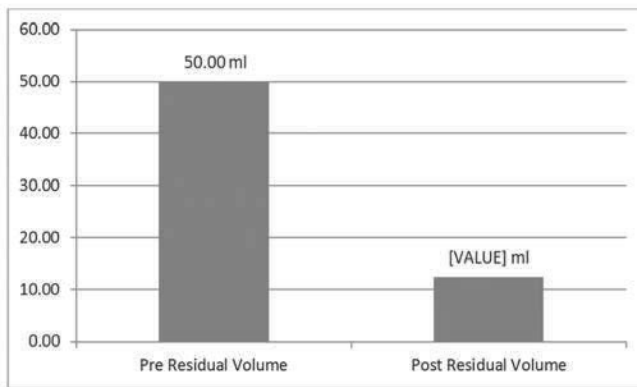


Figure 5. Comparison of pre and urethrotomy, urethral dilatation in terms of residual volume

average of 100 patients undergo TURP, 10 percent of whom develop urethral stricture. Patients come in due to the recurrence of lower urinary tract symptoms, but were eventually cleared of other causes of LUTS such as UTI or urinary tract stones. An initial Uroflowmetry is obtained. Voiding cystourethrogram or flexible cystoscopy strengthens and establishes the diagnosis of urethral stricture. The patients undergo cystoscopy and visual internal urethrogram, and eventually sent home with a French 18 or 16 foley catheter, maintained for 7 to 14 days. On follow up, the catheter is removed, and urethral dilation is done using Urethral Sounds with increasing French size.

It is established that when urethral strictures are primarily treated by urethrotomy followed by urethral dilatation, there is decreased chance of scar contracture and improved recurrence rates. However, there are a lot of predictive factors that would lead to recurrence. In one study, the location of stricture such as the penile urethra, size of >20mm and etiology increased the chances of recurrence, which was not included in the present study.¹⁴

In a study by Wong, et al. there were insufficient data that would tell the best management for urethral strictures. This meta-analysis concluded that in 2 years, 64% of men who were initially treated by urethrotomy required continued self-dilatation or further surgery for stricture recurrence compared to 24% of men treated by primary urethroplasty.

It is well-known that urethral strictures have a high recurrence rate. In this study, 6 patients had recurrence of strictures within 6 months. Although it is expected that internal urethrotomy may improve patient symptoms, a timed urethral calibration and dilatation using urethral sounds may help improve this outcome.

Conclusion and Recommendations

In the present study, the IPSS was statistically lower after urethrotomy with urethral dilatation and the uroflowmetry parameters (peak flow rate, average flow rate, voided volume, and residual volume) were statistically improved after urethrotomy with urethral dilatation.

The Urethral Dilatation Protocol (done every week for 1 month, then every 2 weeks for another 1 month, and monthly until there is markedly improved International Prostate Symptom Score) showed that this timing may help improve IPSS and patient symptoms but not lessen recurrence rates.

Further studies with longer follow up may help detect recurrence rates for urethral dilation after urethrotomy. Other institutions may mimic the timing of this protocol and may improve follow up schedules and outcomes.

An optimal timing of repeated urethral dilatation after urethrotomy may also help avoid invasive surgery such as urethroplasty which sometimes may require the use of grafts. These surgeries will require a longer operative time and a longer recovery period that are undesirable to the patient.

References

1. Adrich DE and Mundy AR. Urethral strictures and their surgical treatment. Institute of Urology and Nephrology, London, UK, 2000
2. Wong SS, Aboumarzouk OM, Narahari R, O'Riordan A, Pickard R. Simple urethral dilatation, endoscopic urethrotomy, and urethroplasty for urethral stricture disease in adult men. Department of Urology, Freeman Hospital, Newcastle-upon-Tyne, UK. 2012

3. Lumen N, Hoebeke P, et al. Etiology of urethral stricture disease in the 21st century, Departments of Urology, Ghent University Hospital, Ghent and Onze-Lieve-Vrouwsiekenhuis-Clinic Aalst (PW), Aalst, Belgium, 2009
4. Santucci J, et al. Male urethral stricture disease, Department of Urology, Wayne State University School of Medicine, Detroit, Michigan, and RAND Health, Santa Monica, California, 2006
5. Bullock TV, Brandes SB. Adult anterior urethral strictures: A national practice patterns survey of board-certified urologists in the United States, Division of Urologic Surgery, Washington University School of Medicine, St. Louis, Missouri, 2006
6. Steenkamp JW , Heyns CF, de Kock MLS. Internal urethrotomy versus dilation as treatment for male urethral strictures: A prospective, randomized comparison Department of Urology, Faculty of Medicine, University of Stellenbosch and Tygerberg Hospital, Tygerberg, South Africa. 1996;
7. Wong SS, Narahari R, O'Riordan A, Pickard R. Simple urethral dilatation, endoscopic urethrotomy, and urethroplasty for urethral stricture disease in adult men. Department of Urology, Freeman Hospital, Newcastle-upon-Tyne, 2012
8. Stamatiou K, Papadatou A, et al. A simple technique to facilitate treatment of urethral strictures with optical internal urethrotomy, Urology Department, Tzaneio General Hospital, Zanni & Afentouli 1 Street, 18536 Piraeus, Greece, 2014
9. Lawrence WT, MacDonagh RP. Treatment of urethral stricture disease by internal urethrotomy followed by intermittent 'low-friction' self-catheterization: preliminary communication. *J Royal Soc Med* 1988.
10. Lauritzena M, Greisb G, et al. Intermittent self-dilatation after internal urethrotomy for primary urethral strictures: A case-control study. *Scand J Urol Nephrol* 2009.
11. Kiyo H. Urodynamic studies before and after gradual urethral dilatation with metal sounds for female urethral stricture, Department of Urology, National Defense Medical College. *Acta Urologica Japonica* 1992
12. Veeratterapillay R, Harding CK, Dorkin TJ Intermittent self-dilatation for urethral stricture disease in males (Review) Jackson MJ, The Cochrane Collaboration, 2014
13. Naudé AM and Heyns CF. What is the place of internal urethrotomy in the treatment of urethral stricture disease? *Nature Rev Urol* 2005.
14. Zehri AA, Athe MH, Afshan Q. Predictors of recurrence of urethral stricture disease following optical urethrotomy. *Int J Surg* 2009.